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April 28, 2005

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APPLICATION NUMBER: 60/558,076

FILING DATE: *March 31, 2004*

RELATED PCT APPLICATION NUMBER: *PCT/US05/10649*



Certified by

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033104

17707 U.S. PTO

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PROVISIONAL APPLICATION FOR PATENT COVER SHEET

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53(c).

2154 U.S. PTO
60/558076

033104

INVENTOR(S)					
Given Name (first and middle [if any])		Family Name or Surname		Residence (City and either State or Foreign Country)	
John David		Rooney Biro		32 Berkeley Circle, Basking Ridge, NJ 07920 42 Cayuga Avenue, Rockaway, NJ 07866	
<input type="checkbox"/> Additional inventors are being named on the _____ separately numbered sheets attached hereto					
TITLE OF THE INVENTION (280 characters max)					
METHOD OF MANUFACTURING OF LOW ODOR PACKAGING MATERIALS					
Direct all correspondence to: CORRESPONDENCE ADDRESS					
<input checked="" type="checkbox"/> Customer Number		25900		<div>Place Customer Number Bar Code Label here</div>	
OR Type Customer Number here					
<input type="checkbox"/> Firm or Individual Name		Sun Chemical Corporation			
Address		222 Bridge Plaza South			
Address					
City		Fort Lee	State	NJ	ZIP 07024
Country		USA	Telephone	201-224-4600	Fax 201-224-2439
ENCLOSED APPLICATION PARTS (check all that apply)					
<input checked="" type="checkbox"/> Specification		Number of Pages 2		<input type="checkbox"/> CD(s), Number	
<input type="checkbox"/> Drawing(s)		Number of Sheets		<input type="checkbox"/> Other (specify)	
<input type="checkbox"/> Application Data Sheet. See 37 CFR 1.76					
METHOD OF PAYMENT OF FILING FEES FOR THIS PROVISIONAL APPLICATION FOR PATENT (check one)					
<input type="checkbox"/> A check or money order is enclosed to cover the filing fees				FILING FEE AMOUNT (\$)	
<input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge filing fees or credit any overpayment to Deposit Account Number		19-4968		\$160.00	
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The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.					
<input checked="" type="checkbox"/> No.					
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Respectfully submitted,

SIGNATURE



TYPED or PRINTED NAME Sidney Persley

TELEPHONE

201-224-4600 Ext. 322

Date

03/31/04

REGISTRATION NO.

34,898

(if appropriate)

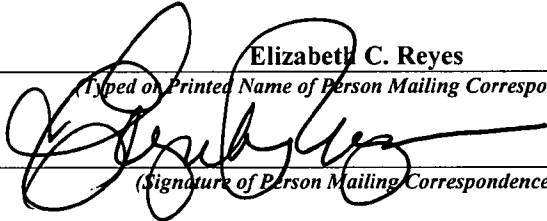
Docket Number:

C-622

USE ONLY FOR FILING A PROVISIONAL APPLICATION FOR PATENT

This collection of information is required by 37 CFR 1.51. The information is used by the public to file (and by the PTO to process) a provisional application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 8 hours to complete, including gathering, preparing, and submitting the complete provisional application to the PTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, Washington, D.C. 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Box Provisional Application, Assistant Commissioner for Patents, Washington, D.C.

P19LARGE/REV05

CERTIFICATE OF MAILING BY "EXPRESS MAIL" (37 CFR 1.10)			Docket No.
Applicant(s): J. Rooney & D. Biro			C-622
Serial No.	Filing Date	Examiner	Group Art Unit
Invention: Method of Manufacturing of Low Odor Packaging Materials			
I hereby certify that the following correspondence:			
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INVENTION RECORD

SUN CHEMICAL

STATUS OF INVENTION		INVENTOR(S) John Rooney and David Biro		CASE NO. C - 6 2 2
		ORIGIN		
CONCEPTION DATE		DESCRIPTIVE TITLE Method of manufacturing of low odor packaging materials.		
DATE OF 1st USE OR SALE		BRIEF ABSTRACT OF INVENTION <i>This invention describes a process of producing low odor packaging materials out of plastic film or paper, solvent or water based printing inks and electron beam curable coating utilizing UV lamp and EB curing unit.</i>		
1st WRITTEN DESC. DATE	WHERE RECORDED? R2888-114, 116-117	DATE PREPARED 3/30/2004	DATE RECEIVED	RATING

DETAILED DESCRIPTION OF INVENTION (SEE INSTRUCTIONS REVERSE SIDE)

Background of Invention

This invention relates to a process of producing food packaging materials utilizing solvent or water based liquid inks and electron beam coating, serving for ink protection and gloss enhancement.

Prior Art

Cryovac's patent US 6 528 127 is teaching a manufacturing process of food packaging materials comprising of printing with solvent based inks over plastic film, drying the inks and then applying EB curable, protective and decorative coating. In this process, excessive amount of residual solvent is typically trapped in the ink under EB coating causing excessive odor of the packaging material. Additionally, since drying rate is significantly different over multiple ink traps, cure and friction characteristics of the finished packaging material are very non-uniformed throughout the printed image. This, in turn, can cause problems with processing the packaging material in the filling lines and higher extractables from the cured EB coating. For example, a job printed at Performance Packaging with three solvent based inks on the polyethylene film and over-printed with EB coating, has the following cure pattern – coating over PE film – 30 MEK rubs, coating over white – 8-10 MEK rubs, coating over yellow, over white – 3-4MEK rubs, coating over black, over, yellow and over white – only 1 MEK rub.

Summary of Invention

This invention describes a process of producing low odor packaging materials that requires printing with solvent or water based printing inks, substantially free of curable functionality, over the plastic film or paper, drying the inks, exposing the printed image to UV lamp, applying electron beam curable coating over the inks and curing it under an exposure to EB irradiation. This process allows a low odor packaging material with uniform friction characteristics and reduced microbial content.

Advantages Over Prior Art

Introduction of UV lamp in the process of producing EB coated packaging material has several distinct advantages over the Cryovac's patent. Heat, generated by UV lamps helps to remove residual solvent which otherwise trapped under EB coating causing excessive odor of the packaging material. Also, trapped solvents negatively affect cure and COF of EB coating. Additional benefit of UV exposure is antimicrobial action of UV light that reduces microbial count in the packaging material, extending shelf life of packaged food.

Description of Invention

Example 1:

A 75 micron thick opaque polyethylene film was coated with a solvent-based red ink (nitrocellulose / polyurethane based) and dried using a hot air gun. Thereafter, a thin protective layer of electron beam curable coating was applied over the red-coated film with a #3 Meyer bar. This was electron beam cured at 3 Mrads, 100kV acceleration voltage and less than 200ppm oxygen. The resultant glossy film has a 60 degree reflective gloss of 71-73% and had a solvent resistance of 17-20 MEK (methyl ethyl ketone) double rubs. The face to face coefficient of friction was 0.39-0.40 static / 0.31-0.32 kinetic as measured on a TMI (Testing Machine Instruments, Amityville, NY, model 32-06) slip friction tester. The residual solvent as measured by GC-headspace was 593 mg/ream.

Example 2:

A 75 micron thick opaque polyethylene film was coated with a solvent-based red ink (nitrocellulose / polyurethane based) and dried using a hot air gun. Immediately thereafter, the coated film was subjected to 250 mJ/cm² of ultraviolet radiation (UV). A thin protective layer of electron beam curable coating was applied over the red-coated film with a #3 Meyer bar. This was electron beam cured at 3 Mrads, 100kV acceleration voltage and less than 200ppm oxygen. The resultant glossy film has a 60 degree reflective gloss of 71-73% and had a solvent resistance of 24-32 MEK (methyl ethyl ketone) double rubs. The face to face coefficient of friction was 0.39-0.40 static / 0.31-0.32 kinetic as measured on a TMI (Testing Machine Instruments, Amityville, NY, model 32-06) slip friction tester. The residual solvent as measured by GC-headspace was 402 mg/ream.

Table A:

	MEK rubs	Residual solvent	CoF	60° Gloss
Example 1 (no UV)	17-20	593 mg/ream	0.39-0.40 / 0.31-0.32	71-73
Example 2 (UV)	24-32	402 mg/ream	0.39-0.40 / 0.30-0.31	71-73

Main Claims

1. A process of producing food packaging material comprising of printing on plastic film with liquid inks substantially free of curable functionality, drying them, exposing inks to ultra-violet irradiation, applying EB curable coating over the ink and curing coating under electron beam exposure.
2. A process of claim 1 one where an ink is solvent based.
3. A process of claim 1 one where an ink is water based.
4. A low odor packaging material, produced according to claim 1 with residual solvent remaining after UV exposure less than 500 ppm total.
5. A packaging material, produced according to Claim 1 with minimum cure of EB coating, regardless of number of trapped colors, that is not less than 5 MEK rubs.